

B. Skip Traffic Stripe

Skip stripe is measured by the gross linear foot (meter) or gross linear mile (kilometer) as specified. The unpainted spaces between the stripes are included in the overall measurement, if the Plan ratio is not interrupted. Measurement begins and ends on a stripe.

C. Payment by Square Yard (Meter)

When preformed pavement markings are paid for by the square yard (meter), the number of square yards (meters) covered is measured. The space between the markings is included in the overall measurement. The color, width, and type are according to the Plans.

D. Preformed Plastic Word or Symbol

Each preformed plastic word or symbol, complete according to Plan dimensions, is measured by the unit. The code for each word or symbol is stated in the Plans.

E. Removing Existing Pavement Markings

Measurement and payment for removing pavement markings will be according to Section 656 when shown in the Proposal as a payment Item. Otherwise, removal will not be paid for separately, but will be included in the payment for other Work under this Section.

657.4.01 Limits

General Provisions 101 through 150.

657.5 Payment

Payment in each case is full compensation for applying markings, including adhesives, cleaning, application, and traffic control necessary to complete the Item.

Payment will be made under:

Item No. 657.	Preformed plastic solid pavement markings_____ in (mm), (<u>color</u>), (<u>type</u>)	Per linear foot (meter)
Item No. 657.	Preformed plastic solid pavement markings_____ in (mm), (<u>color</u>), (<u>type</u>)	Per linear mile (kilometer)
Item No. 657.	Preformed plastic skip pavement markings_____ in (mm), (<u>color</u>), (<u>type</u>)	Per gross linear foot (meter)
Item No. 657.	Preformed plastic skip pavement markings_____ in (mm), (<u>color</u>), (<u>type</u>)	Per gross linear mile (kilometer)
Item No. 657.	Preformed plastic pavement markings	Per square yard (meter)
Item No. 657.	Preformed plastic pavement markings, words or symbols (<u>color</u>), (<u>type</u>)	Per each

657.5.01 Adjustments

General Provisions 101 through 150.

Section 659—Hot Applied Preformed Plastic Pavement Markings

659.1 General Description

This work includes furnishing and placing hot applied preformed plastic pavement markings according to these Specifications and at locations shown in the Plans or as otherwise directed. Use applied markings that are very durable, impervious to oil and grease, and provide immediate and continuing retroreflectivity. Use hot applied preformed plastic pavement markings that are compatible with existing alkyd and hydrocarbon thermoplastic material.

659.1.01 Definitions

General Provisions 101 through 150.

659.1.02 Related References**A. Standard Specifications**

General Provisions 101 through 150.

B. Referenced Documents

Manual on Uniform Traffic Control Devices for Streets and Highways

AASHTO M 249

659.1.03 Submittals

Transfer to the Department all manufacturer warranties or guarantees for heat-applied preformed plastic marking materials. Ensure that warranties or guarantees can be transferred.

659.2 Materials

A. Marking Characteristics

Ensure that markings have the following characteristics:

1. Composition

The pavement marking material shall consist of a homogeneous mixture of high quality hydrocarbon resin, alkyd resin, or modified ester rosin solution in conjunction with aggregates, pigments, binders, and glass beads. Use thermoplastic material that conforms to AASHTO M 249, except for relevant differences due to the material being supplied in a preformed state.

The markings shall contain at least 30% glass beads that conform to AASHTO M 247, Type 1. Use glass beads that are clear and transparent with at least 80% true spheres. The glass beads shall have a minimum index of refraction of 1.50.

2. Pigmentation

a. White

The white markings shall contain at least 8% by weight of titanium dioxide pigment meeting ASTM D 476, Type II, Rutile. The color shall be Federal Highway White, Color 17886, as per Federal Standard 595. The white markings shall have a minimum daylight reflectance (Y value) at 45°/0° of 80%.

b. Yellow

The yellow markings shall contain sufficient yellow pigment to ensure a color of Federal Highway Yellow, Color 13538, as per Federal Standard 595. The yellow markings shall have a minimum daylight reflectance (Y value) at 45°/0° of 45%.

3. Shapes and Sizes

Prefabricated legends and symbols must conform to the applicable shapes and sizes outlined in the “Manual on Uniform Traffic Control Devices for Streets and Highways.” As an option, turn arrows and combination arrows may come without pre-applied surface glass beads to allow reversibility.

4. Thickness

Ensure that the material is at least 0.125 in (3.175 mm) thick.

5. Retroreflectivity

The preformed markings shall have the following initial minimum reflectivity values:

White @ 86.5° incidence angle and 1.5° divergence angle	350 candle power/ft candle ft ² (350 mc/lx/m ²)
Yellow @ 86.5° incidence angle and 1.5° divergence angle	200 candlepower/ft candle ft ² (200 mc/lx/m ²)

6. Skid Resistance

The surface of the preformed markings shall provide a minimum skid resistance of 45 BPM when tested according to ASTM E 303.

B. Heating Characteristics

The preformed markings shall be capable of being affixed to bituminous or Portland cement concrete pavements by the use of the normal heat of a torch recommended by the manufacturer and according to the manufacturer’s installation guidelines. The preformed markings shall have resealing characteristics so that it will fuse with itself and with previously applied marking material of the same composition under normal conditions of use.

659.2.01 Delivery, Storage, and Handling

The markings shall be manufactured and packaged in a way that permits storage at normal shelf temperatures for up to one year after purchase.

659.3 Construction Requirements

659.3.01 Personnel

General Provisions 101 through 150.

659.3.02 Equipment

General Provisions 101 through 150.

659.3.03 Preparation

General Provisions 101 through 150.

659.3.04 Fabrication

General Provisions 101 through 150.

659.3.05 Construction

A. Pre-Conditions for Applying Markings with Heat

Apply markings under the following conditions:

1. Apply markings when the ambient temperature is 35 °F (2 °C) or above.
2. Apply markings when the pavement is clean, dry, and free of debris.
3. Apply drop-on glass beads to the entire surface of preformed markings that do not have factory pre-applied surface beads.
4. Apply the drop-on glass beads to the preformed marking material while still in a liquid state. Use beads that meet the same requirements specified in Subsection 659.2.A.

659.3.06 Quality Acceptance

Materials shall be evaluated by the National Transportation Product Evaluation Program (NTPEP), the Georgia Department of Transportation or other State DOT test facilities before being approved for use. Data generated from the field tests will be used to select those materials that have performed satisfactorily during the evaluation period.

Hot applied preformed plastic pavement markings that have met the laboratory test and field test requirements will be placed on the Georgia Department of Transportation Qualified Products List. The manufacturer shall certify that the Hot Applied Preformed Plastic Pavement Markings supplied to construction and maintenance projects is formulated of the same material as when tested by NTPEP and will conform to the requirements of this Specification. Products that have met all the requirements in this Section but fail to perform adequately in actual use will be removed from the Qualified Products List.

659.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

659.4 Measurement

Heat-applied preformed plastic pavement markings, complete in-place and accepted, are measured as follows:

A. Solid Traffic Stripe

Solid traffic stripe of the color, width, and type shown on the Plans or in the Proposal will be measured by the linear foot (meter) or linear mile (kilometer) as specified. Breaks or omissions in solid lines or stripes at street or road intersections will not be measured for payment.

B. Skip Traffic Stripe

Skip traffic stripe of the color, width, and type shown on the Plans or in the Proposal will be measured by the gross linear foot (meter) or gross linear mile (kilometer) as specified. The unpainted spaces between the stripes will be included in the overall measurement if the Plan ratio remains uninterrupted. Measurement will begin and end on a stripe.

C. Payment by Square Yard (Meter)

When hot applied preformed plastic pavement markings are paid for by the square yard (meter), the actual number of square yards (meters) covered will be measured in the overall measurement, including the space between the markings. The color, width, and type shall be indicated on the Plans.

D. Heat Applied Preformed Plastic

Each heat-applied preformed plastic word or symbol, complete according to Plan dimensions, is measured by the unit. The code for each word or symbol is stated in the Plan.

659.4.01 Limits

General Provisions 101 through 150.

659.5 Payment

Payment in each case will be full compensation for all aspects of heat-applied markings, including adhesives, cleaning, application, and traffic control necessary to complete the Item.

Payment will be made under:

Item No. 659	Hot applied preformed plastic solid pavement markings_____ in (mm), (<u>color</u>), (<u>type</u>)	Per linear foot (meter)
Item No. 659	Hot applied preformed plastic solid pavement markings_____ in (mm), (<u>color</u>), (<u>type</u>)	Per linear mile (kilometer)
Item No. 659	Hot applied preformed plastic skip pavement markings_____ in (mm), (<u>color</u>), (<u>type</u>)	Per gross linear foot (meter)
Item No. 659	Hot applied preformed plastic skip pavement markings_____ in (mm), (<u>color</u>), (<u>type</u>)	Per gross linear mile (kilometer)
Item No. 659	Hot applied preformed plastic pavement markings	Per square yard (meter)
Item No. 659	Hot applied preformed plastic pavement markings words or symbols (<u>color</u>), (<u>type</u>)	Per each

659.5.01 Adjustments

General Provisions 101 through 150.

Section 660—Sanitary Sewers

660.1 General Description

This work includes furnishing materials and installing sanitary sewers and appurtenances.

660.1.01 Definitions

House Connection: A sewer pipe from a single building to a common sewer or discharge point.

660.1.02 Related References**A. Standard Specifications**

Section 207—Excavation and Backfill for Minor Structures

Section 611—Relaying, Reconstructing, or Adjusting to Grade of Miscellaneous Roadway Structures

Section 668—Miscellaneous Drainage Structures

Section 801—Fine Aggregate

Section 830—Portland Cement

Section 841—Iron Pipe

Section 842—Clay Pipe

Section 843—Concrete Pipe

Section 847—Miscellaneous Pipe

Section 848—Pipe Appurtenances